Space Weather Forecast

Issued on Wednesday, 24 January 2024 at 00:53 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME (Coronal Mass Ejection) arrivals possible later 25 January into early 26 January, with Minor to Moderate geomagnetic storming likely. Moderate solar activity likely.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate with multiple flares observed from a region nearing north centre disc and another region in the southwest. The region near north centre disc is long with magnetic complexity in the middle. In the southwest is the most complex region, with multiple mainly small spots which keep changing in configuration, but including areas of magnetic complexity. In addition, it is in close proximity to another region which has developed a trailer with its own magnetic complexity, although arguably the two could now be considered one region. The remaining regions appear simpler at this time.
There have been several Coronal Mass Ejections (CMEs) emerge in the last 24 hours, some of which have the potential to glance Earth in the coming days. Analysis is still underway, but the most likely time for CME impacts is 25 into 26 January.

Solar Wind / Geomagnetic Activity: Solar winds have been at mostly slightly elevated levels with weak CME effects. Wind speeds varied between 360-450 km/s. Total magnetic field strength has been weak to moderate, with the north-south component varying mostly weakly. Geomagnetic activity has been Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: Although no solar radiation storms were observed, radiation levels were slightly elevated at first, but declined to background over the 24 hour period.

Four-Day Space Weather Forecast Summary
Solar Activity: Moderate activity is likely throughout from the two more active regions on the disc. There is also a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: There is potential for at least three CME glancing blows in the coming days. The bulk of these CMEs is expected to pass either over or under Earth's orbit, but some impact at Earth is likely. In addition, these CMEs are all expected at a similar time - from later on Day 2 (25 Jan) to early on Day 3 (26 Jan), with the possibility that they either combine or arrive one after the other, perhaps increasing any geomagnetic effects.
Overall, geomagnetic activity is expected to be Quiet to Unsettled on Day 1 (24 Jan). An increase is expected later Day 2 into Day 3, perhaps step-wise if the various CMEs arrive separately, with G1-G2/Minor-Moderate Storms likely and a slight chance of G3/Strong Storms, should the CMEs combine favourably for this to occur.

Energetic Particles / Solar Radiation: There is a slight chance of S1/Minor radiation storms through the period due to the two complex regions on the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	50	70	10
Strong	G3	No	1	5	15	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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